

Siting of a Utility-Scale Solar Collection Facility

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Data reference:

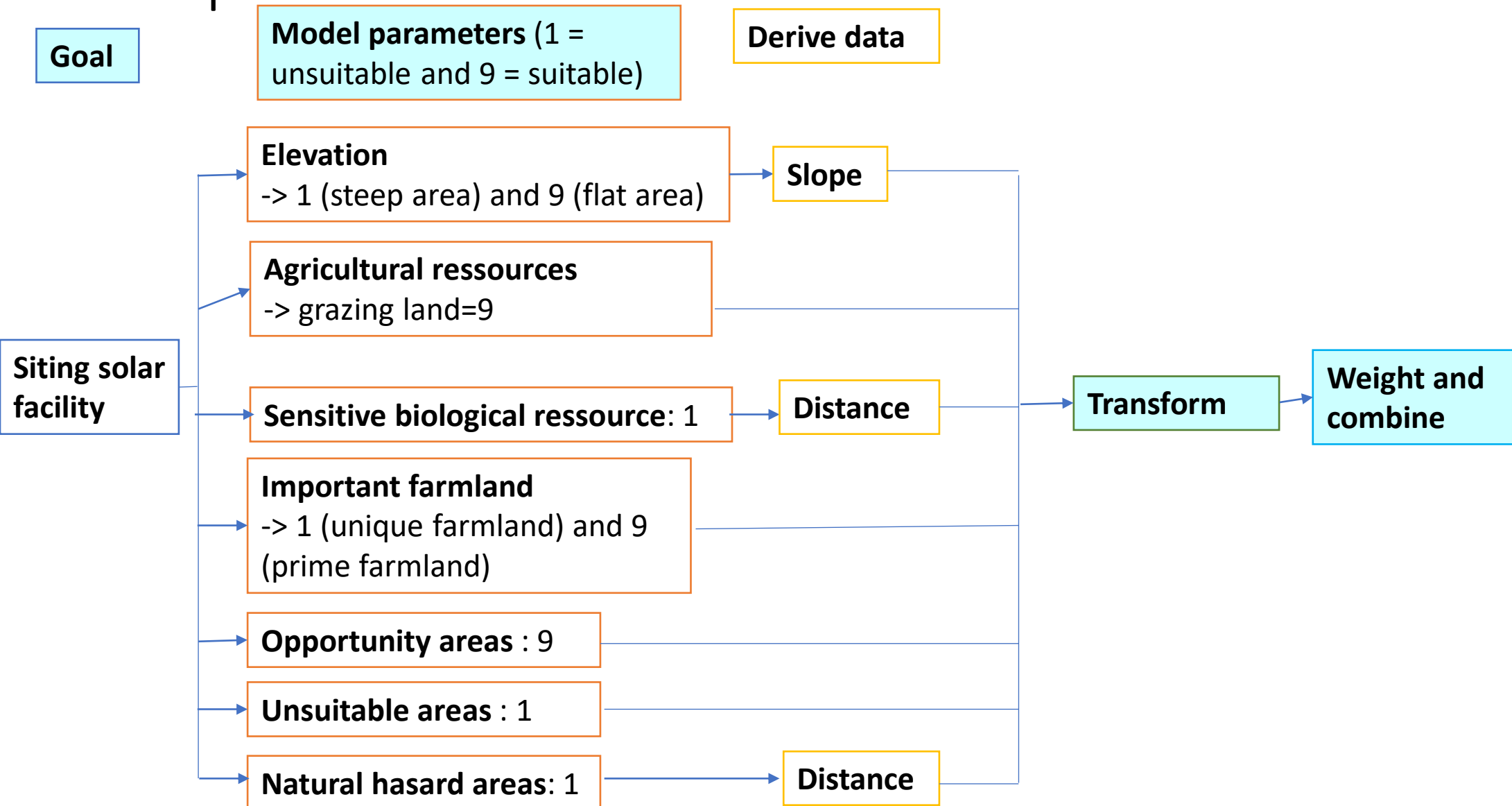
<https://www.coursera.org/learn/spatial-analysis-and-data-handling-using-arcgispro/resources/e0nXo>

<https://www.coursera.org/learn/spatial-analysis-and-data-handling-using-arcgispro/resources/E4H5a>

Outlining process

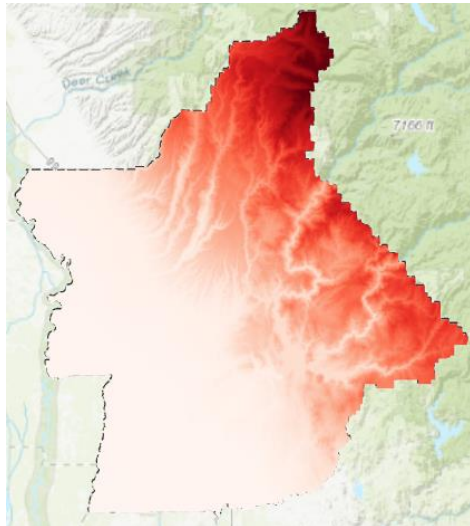
- 1) Schematic representation of model inputs and steps
- 2) Data transformation (proximity metrics and slope)
- 3) Reclassification of variables to the same ranking scale
- 4) Weighted overlay suitability model in Model Builder
- 5) Presentation of the output of equal weights model using a continuous color ramp
- 6) Presentation of the output of adapted weights model using a continuous color ramp

1) Schematic representation of model inputs and steps



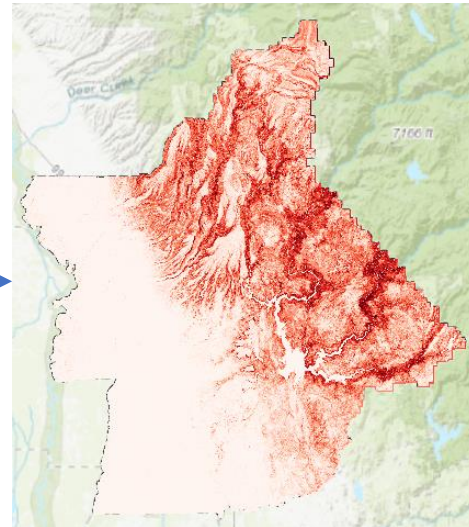
2) Data transformation (from DEM to slope)

DEM



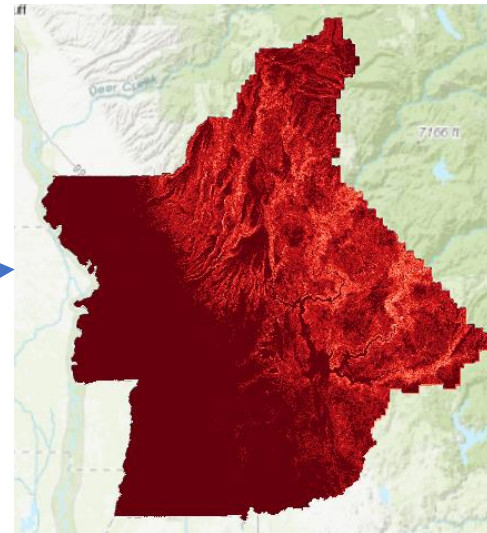
Dark red: steep area
Light red: flat area

Slope



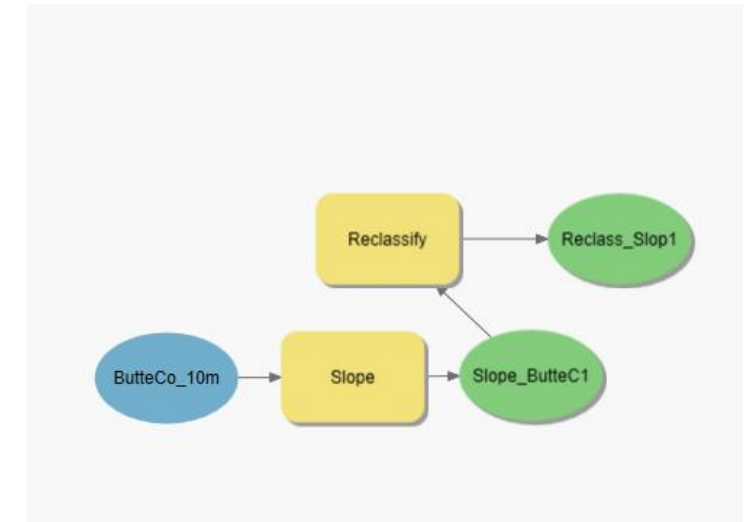
Dark red: steep area
Light red: flat area

Reclassification of slope values in order that increasing value represents the inscreasing suitability for solar siting



Dark red: flat area
Light red: steep area

Model Builder

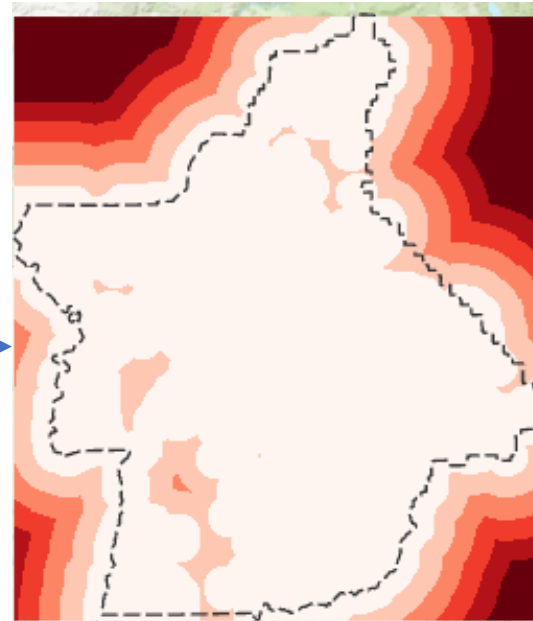
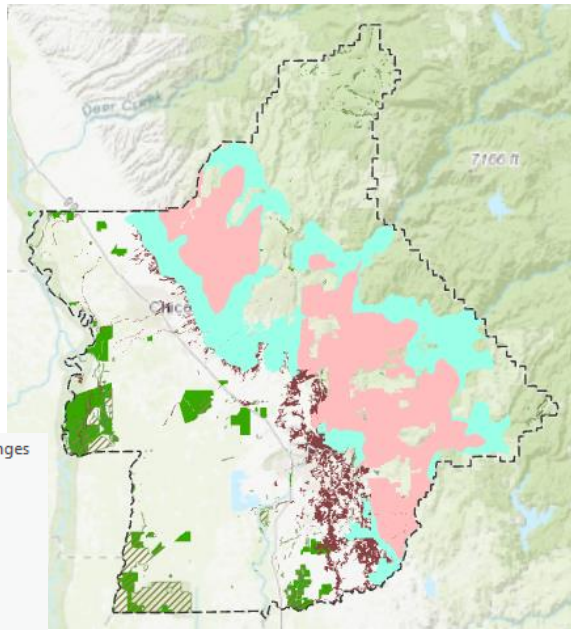


Sensitive biological resource layer transformation (Euclidian distance and reclassification)

Sensitive biological
ressource layer

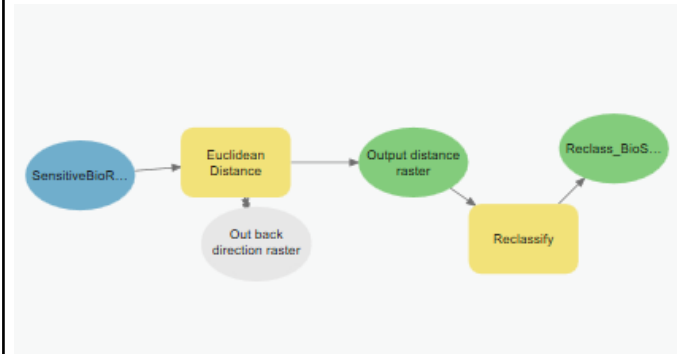
Euclidian distance and reclassified
raster from Sensitive biological
ressource layer

Model Builder



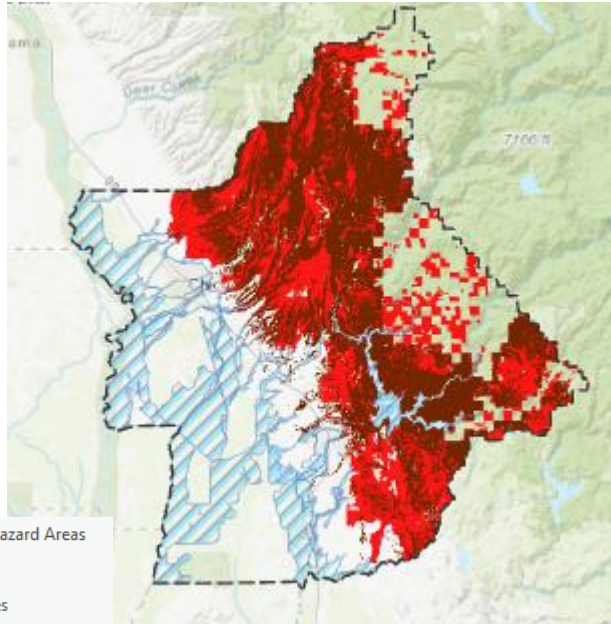
All the
different
biological
constraints
have been
merged
together
previously
to create
this raster

Dark red: far from sensitive biological ressource area
Light red: close to sensitive biological ressource area

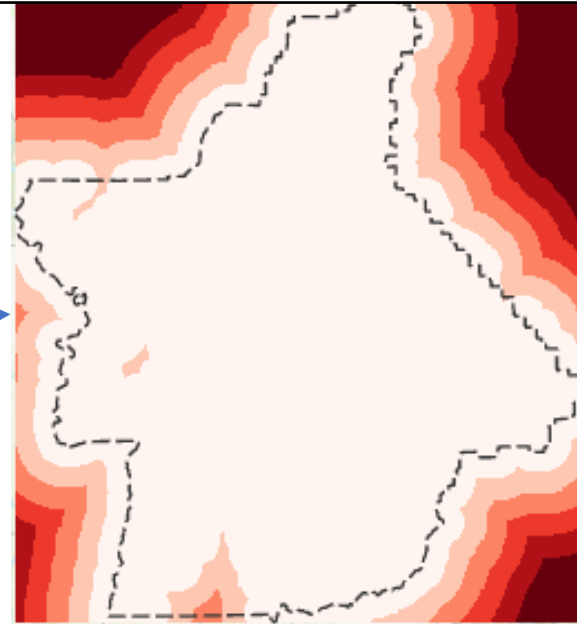


Natural hazard layer transformation (Euclidian distance and reclassification)

Natural hazard layer



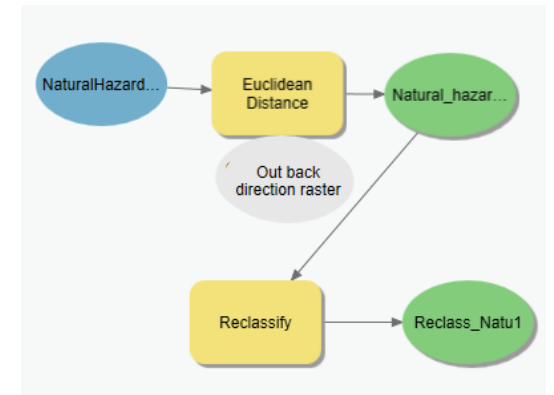
Euclidian distance and reclassified raster from Sensitive biological resource layer



All the different natural hazard constraints have been merged together previously to create this raster

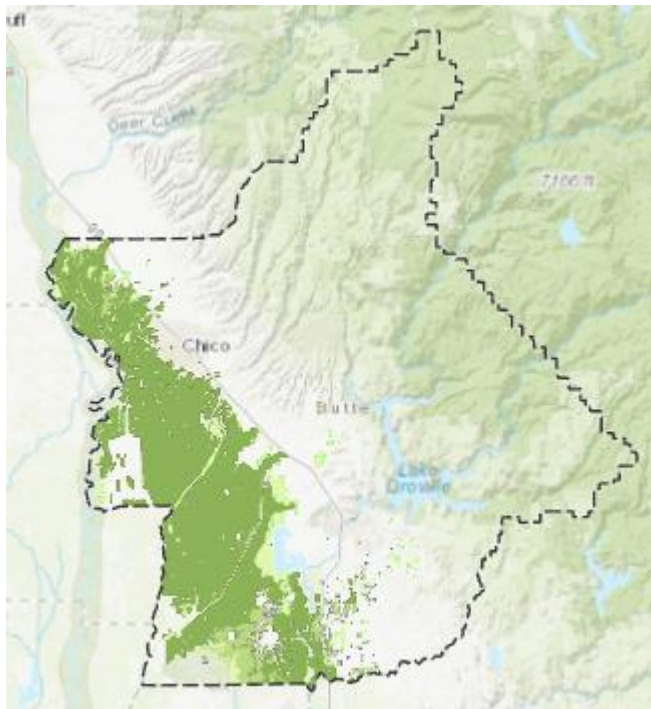
Dark red: far from natural hazard area
Light red: close to natural hazard area

Model Builder

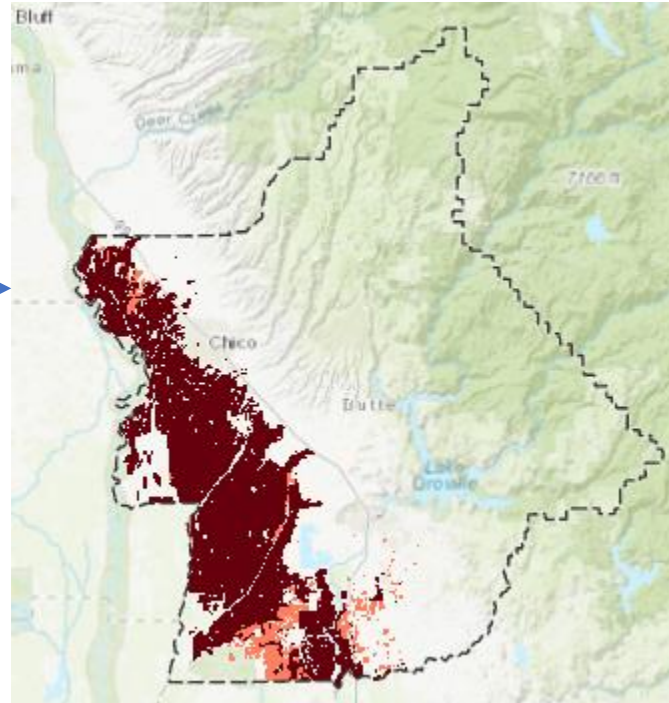


Importance farm transformation (reclassification)

Importance farm layer

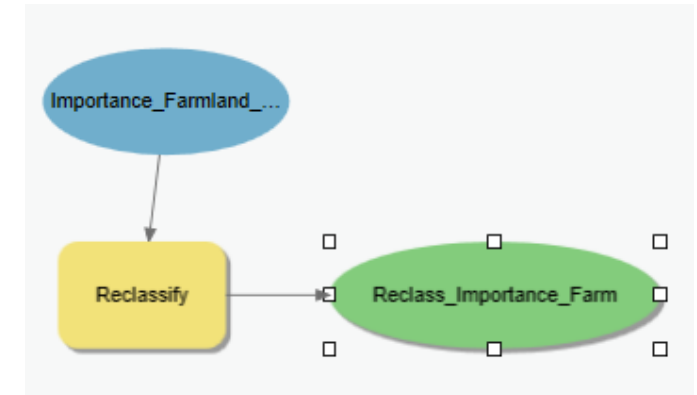


Reclassified raster from importance farm layer



Dark red: farm of weak importance (prime)
Light red: farm of great importance (unique and state)

Model Builder

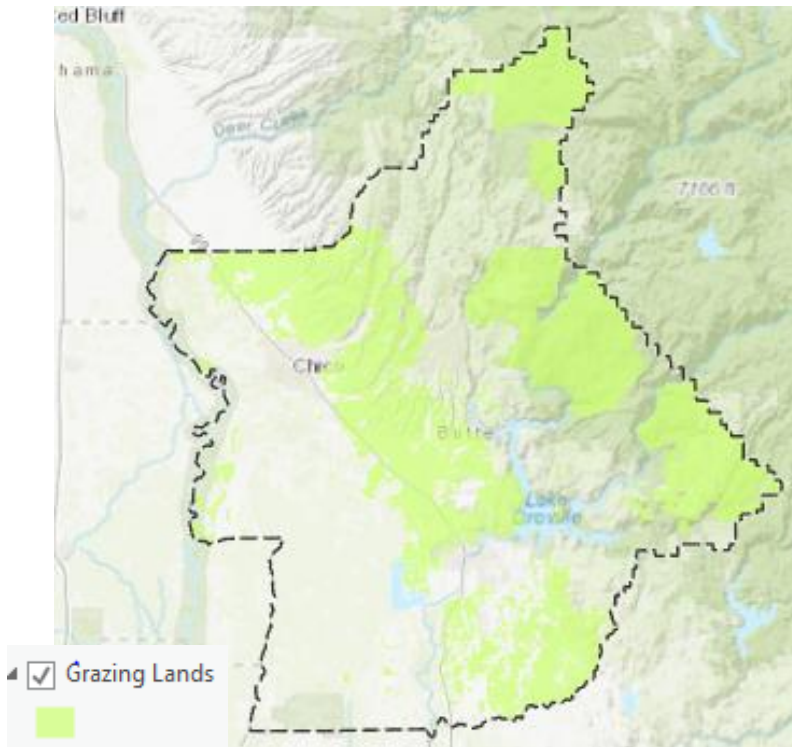


Classification values:

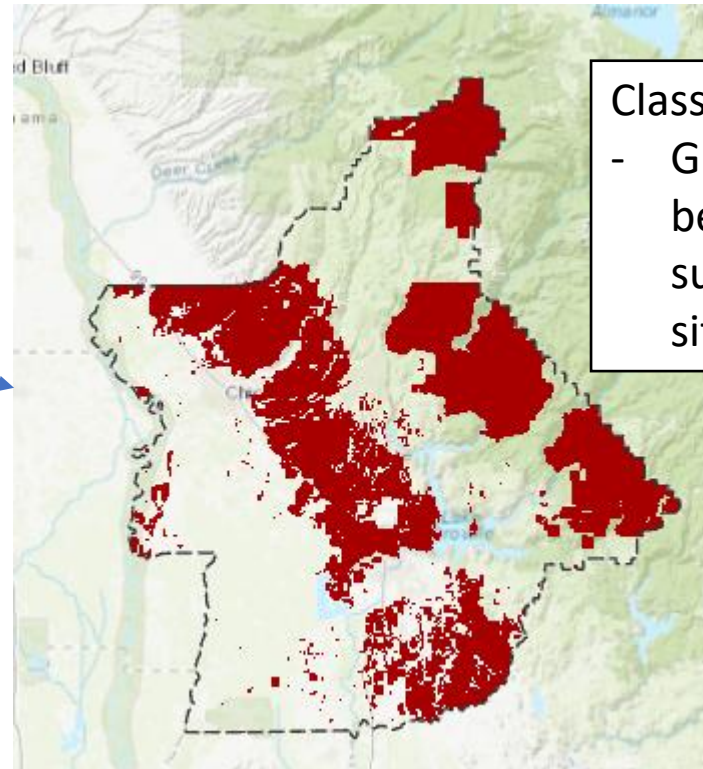
- Unique farm = 1
- State farm = 5
- Prime farm = 9

Agricultural resource transformation (reclassification)

Grazing land layer

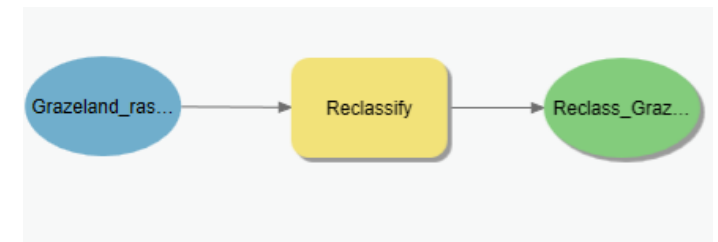


Reclassified raster from grazing
land layer



Classification values:
- Grazing land =9
because it is
suitable for solar
siting

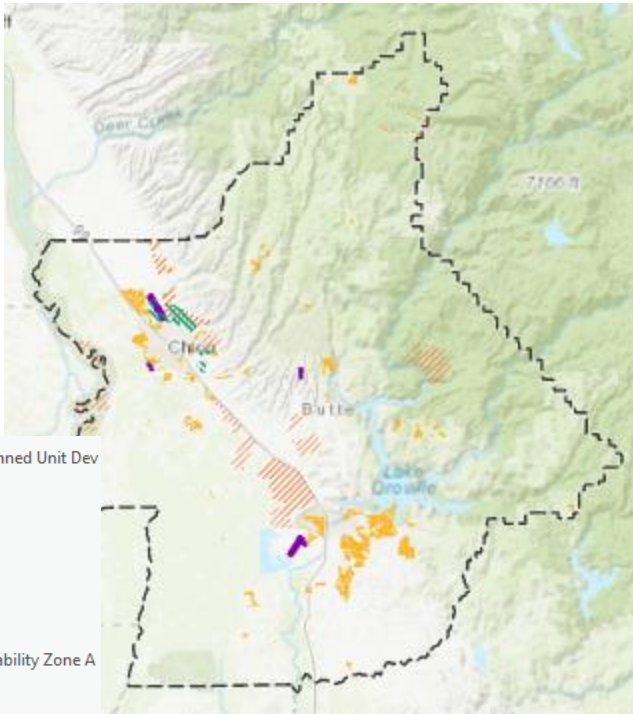
Model Builder



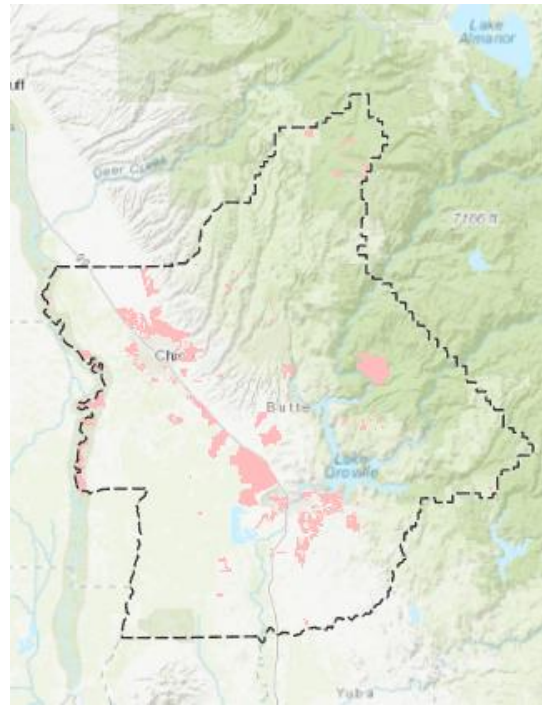
Dark red: farmland suitable for solar siting

Unsuitable area transformation (reclassification)

Unsuitable area layer



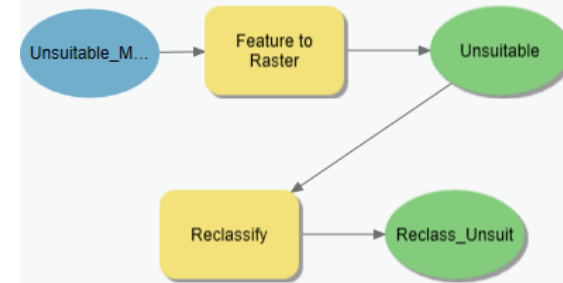
Reclassified raster from unsuitable area layer



All the different unsuitable area constraints have been merged together previously to create this raster

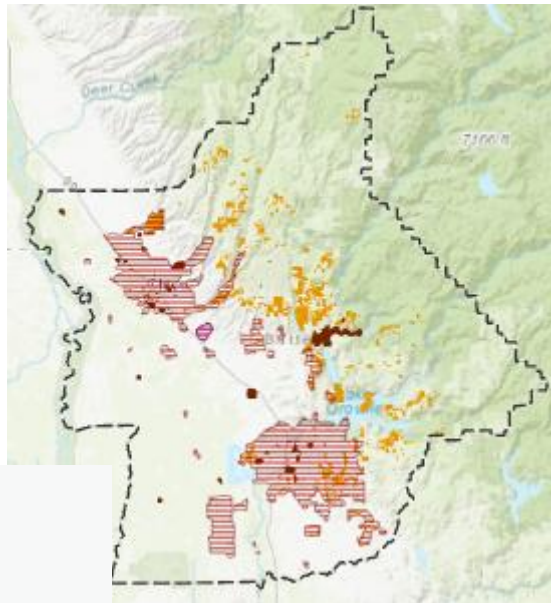
Classification values:
- Unsuitable area = 1

Model Builder

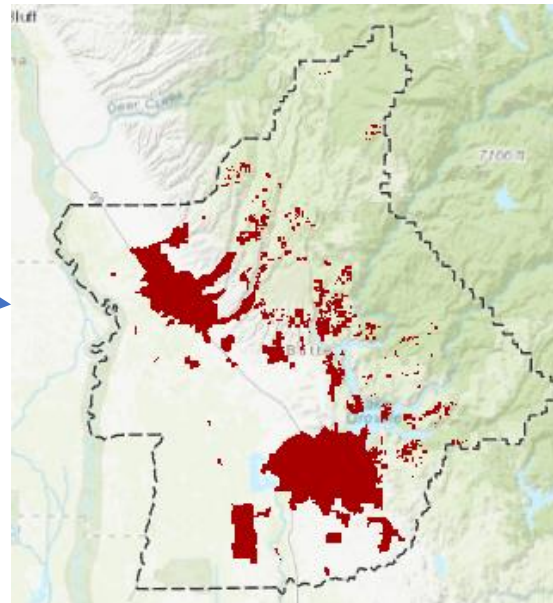


Suitable area transformation (reclassification)

Suitable area layer

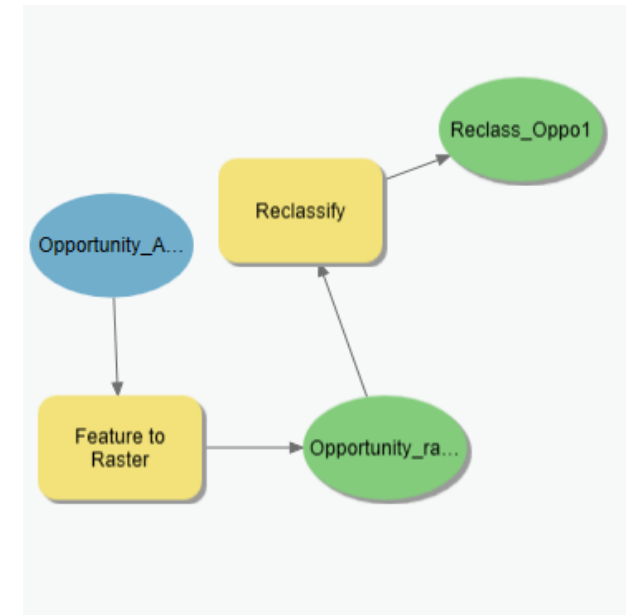


Reclassified raster from suitable area layer



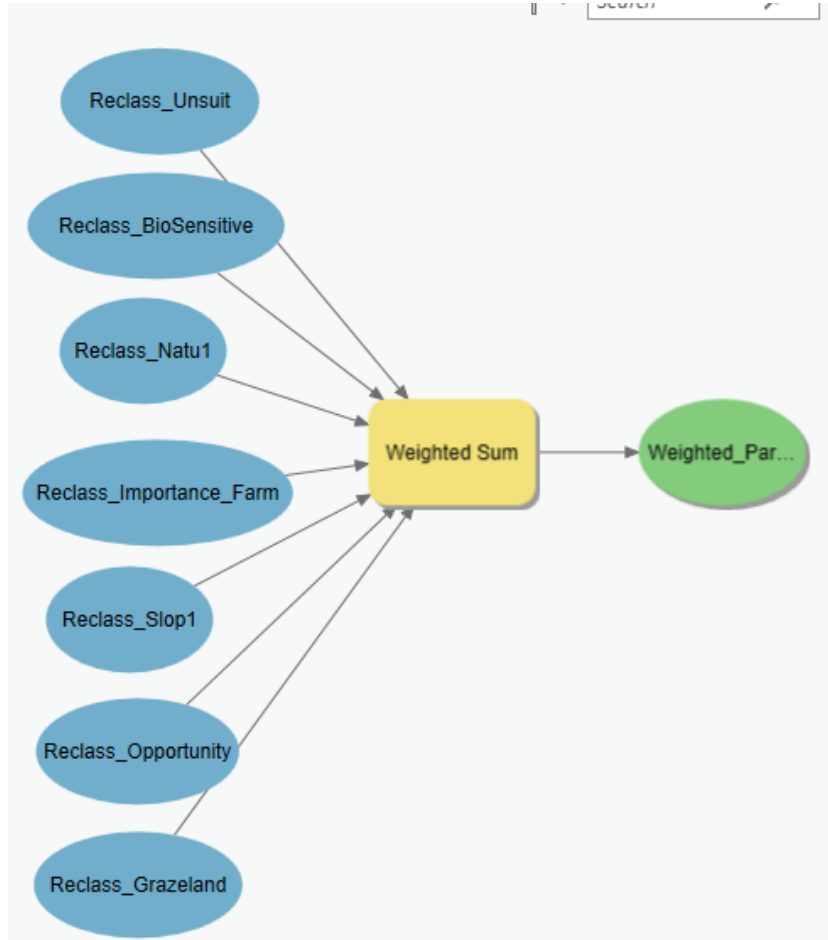
Different suitable area constraints have been merged together previously to create this raster

Model Builder



Classification values:
- Suitable area = 9

Weighted overlay suitability model in Model Builder



Unsuitable inputs:

- > Unsuitable areas
- > Sensitive biologic areas
- > Natural hazard

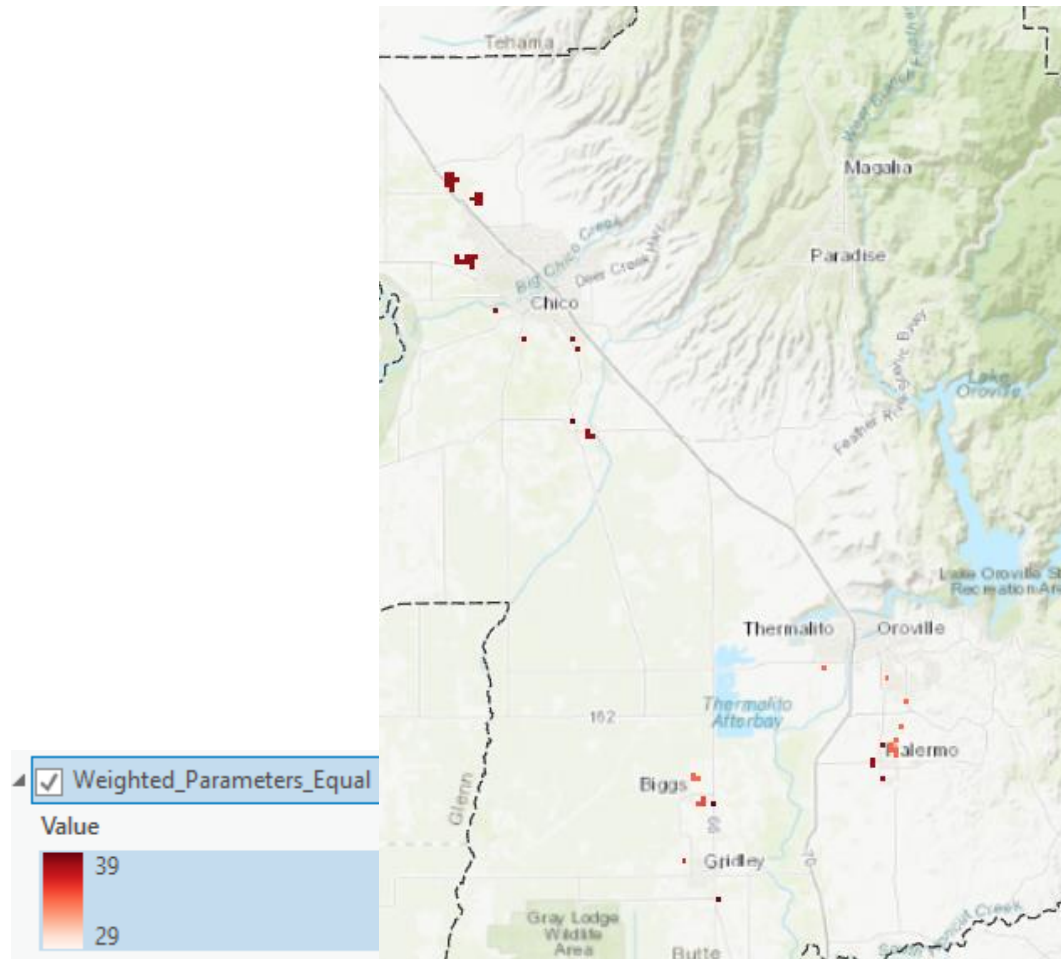
Unsuitable and suitable inputs:

- > Farm importance
- > Slope

Suitable inputs:

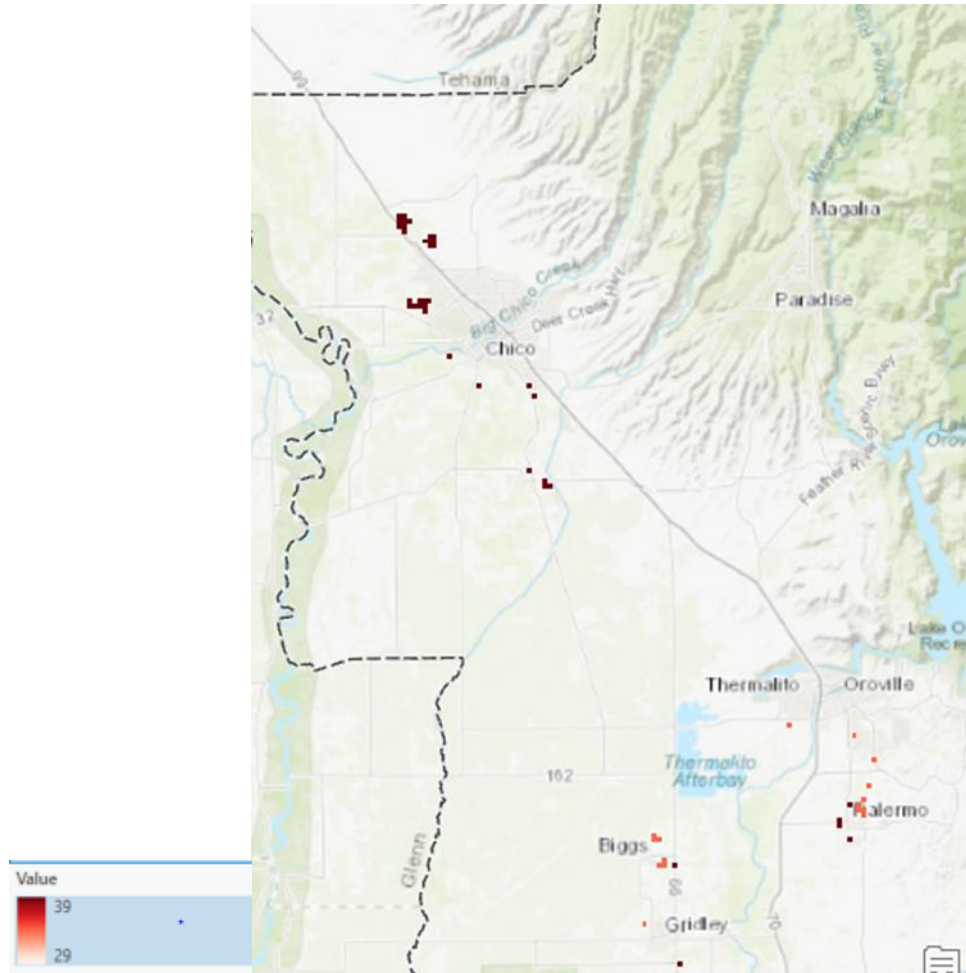
- > Opportunity areas
- > Grazeland

Presentation of the output of equal weights model using a continuous color ramp



At the same level, biological data like natural hazard, sensitive biological area and physical data like slope contain a lot of constraints and affect the results by reducing the potential area for solar siting.

Presentation of the output of adapted weights model using a continuous color ramp



If we reduce the weight of biological and physical parameter, the area suitable for solar siting appears darker meaning greater value and suitability.